SELECTION GUIDE

Relion® 615 and 620 series
ANSI feeder protection

		REF615 Functional Application											REF620 Functional Application		
		Firmware Version 4.0, 4.2						Firmware Version 5.0 FP-1					Firmware Version 2.0		
Included = •, Optional = ◦	**ANSI Function**	**A**	**B**	**C**	**D**	**E**	**F[1]**	**D**	**F**	**L**	**N**	**P**	**A**	**B**	**C**
Protection															
Phase overcurrents	51P, 50P	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Phase long time overcurrent	51LT	•	—	•	•	—	•	—	—	—	—	—	•	•	•
Directional phase overcurrents	67P	—	—	◦	•	—	•	—	•	•	•	•	•	•	•
Phase power directional	32P	—	—	◦	•	•	•	—	—	—	—	—	•	•	•
Underpower	32U	—	—	—	—	—	—	—	—	•	•	—	—	—	—
Reverse Power/Overpower	32R/32O	—	—	—	—	—	—	—	—	•	•	—	—	—	—
Neutral overcurrents	51N, 50N	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ground overcurrents	51G, 50G	◦	•	◦	◦	•	•	•	•	•	•	•	◦	—	◦
Harmonics-based ground-fault protection	51NHA	—	—	—	—	—	—	◦	◦	◦	◦	—	—	—	—
Admittance-based ground-fault protection	21YN	—	—	—	—	—	—	—	◦	◦	◦	—	—	—	—
Wattmetric-based ground-fault protection	32N	—	—	—	—	—	—	—	◦	◦	◦	—	—	—	—
Transient/intermittent ground-fault protection	67NIEF	—	—	—	—	—	—	—	◦	◦	◦	—	—	—	—
Bus protection via GOOSE messaging	87B	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bus protection High Impedance	87B	•[1]	—	—	—	—	—	—	—	—	•	—	—	—	—
Directional neutral overcurrents	67N	—	—	◦	•	—	•	—	•	•	•	•	•	•	•
Neutral power directional	32N	—	—	◦	•	•	•	—	—	—	—	—	•	•	•
Sensitive earth fault	50SEF	◦	—	◦	◦	—	—	•	•	•	•	—	◦	—	◦
Phase Distance Protection	21P	—	—	—	—	—	—	—	—	—	—	—	•	•	•
Negative sequence overcurrents	46	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Load sheds and restorations	81LSH	—	—	◦	•	—	—	—	—	—	—	—	•	•	•
Underfrequencies, overfrequencies, rate-of-changes	81	—	—	◦	•	—	—	—	—	•	•	—	•	•	•
Cable fault detection (CFD) for underground and overhead feeder cables	CFD	◦	—	◦	◦	—	—	—	—	—	—	—	•	•	•
High impedance fault (HIZ)	HIZ	◦	—	◦	◦	—	—	•	•	—	•	—	◦	-	◦
Thermal overload	49F	•	•	•	•	•	—	•	•	•	•	—	•	•	•
Phase discontinuity	46PD	•	—	•	•	—	—	•	•	•	•	—	•	•	•
Cold load inrush detection (seconds, minutes)	62CLD	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Switch onto fault	SOTF-1	—	—	—	—	—	—	•	•	•	•	—	—	—	—
Undercurrent	37	•	•	•	•	•	•	—	—	—	—	—	•	•	•
Restricted earth fault (REF), low impedance	87LOZREF	◦	—	◦	◦	—	—	—	—	—	—	—	◦	—	—
Phase undervoltages	27	—	—	◦	•	•	•	—	•	•	•	•	•	•	•
Remanent undervoltage1	27R	—	—		•[1]	—	•	—	—	◦	•	•	—	—	—
Phase overvoltages	59	—	—	◦	•	•	•	—	•	•	•	•	•	•	•
Phase sequence overvoltages	47	—	—	◦	•	•	•	—	•	•	•	•	•	•	•
Ground overvoltage	59G	—	—	—	•	—		—	•	•	•		•	—	—
Neutral overvoltage	59N	—	—	◦	•	•	•	—	•	•	•	•	•	•	•

		REF615 Functional Application											REF620 Functional Application		
		Firmware Version 4.0, 4.2						Firmware Version 5.0 FP-1					Firmware Version 2.0		
Included = •, Optional = ◦	**ANSI Function**	**A**	**B**	**C**	**D**	**E**	**F[1]**	**D**	**F**	**L**	**N**	**P**	**A**	**B**	**C**
Protection															
Circuit breaker failure	50BF	•	•[2]	•	•	•[2]	•	•	•	•	•	•	•	•	•
Three-phase Inrush Detector	INR	—	—	—	—		—	•	•	•	•	•	•	•	•
Electrically latched/self-resetting trip digital outputs	86/94	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Phase current sets summing function	CSUM	—	—	—	—	—	—	—	—	—	—	—	—	•	•
Three phase measurement switching	VSWI	—	—	—	—	—	—	—	—	—	—	—	—	•	•
Arc flash detection via three lens sensors	AFD-1, AFD-2, AFD-3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Control															
Control for one breaker		•	—	•	•	—	—	•	•	•	•	•	•	—	—
Control for breaker and a half		—	—	—	—	—	—	—	—	—	—	—	—	•	•
Control for two breakers		—	•	—	—	•	•	—	—	—	—	•	—	—	•
Control for disconnector		—	—	—	—	—	—	•	•	•	•	•	—	—	—
Control for earthing switch		—	—	—	—	—	—	•	•	•	•	•	—	—	—
Autoreclose	79	◦	—	◦	◦	—	—	◦	◦	◦	◦	◦	•	•	•
Synchronism check	25	—	—	—	•	—	•	—	—	◦	•	•	•	•	•
Number of pages in HMI		1	1	1	1	1	1	2	2	2	2	2	2	2	2
Customizable HMI		•	•	•	•	•	•	•	•	•	•	•	•	•	•
User programmable LEDs		11	11	11	11	11	11	11	11	11	11	11	11	11	11
User programmable push buttons		—	—	—	—	—	—	—	—	—	—	—	16	16	16
Monitoring and supervision															
Trip circuit monitoring	TCM	•	•[2]	•	•	•[2]	•	•	•	•	•	•	•	•	•
Breaker condition monitoring	52CM	•	•[2]	•	•	•[2]	•	•	•	•	•	•	•	•	•
Fuse failure	60	—	—	◦	•	•	•	•	•	•	•	•	•	•	•
Current circuit supervision	CCM	•	—	•	•	—	—	•	•	•	•	•	•	—	•
Metering															
Three-phase currents	IA, IB, IC	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sequence currents	I1, I2, I0	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ground current	IG	—	—	—	—	—	—	•	•	•	•	•	•	—	•
Demand phase currents		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Maximum and minimum demand values		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Three-phase voltages	VA, VB, VC	—	—	•	•	•	•	—	•	•	•	•	•	•	•
Sequence voltages	V1, V2, V0	—	—	•	•	•	•	—	•	•	•	•	•	•	•
Ground voltage	VG	—	—	—	•	—	—	—	•	—	•	—	•	—	—
Power and energy (1-phase, 3-phases) and power factor	P, E, PF	—	—	•	•	•	•	—	•	•	•	•	•	•	•
Fault location	FLO	—	—	•	•			—	—	◦	◦	◦	•	•	•
Frequency	f	—	—	—	—	—	—	—	•	•	•	•	•	•	•
RTD/mA measurement		—	—	—	—	—	—	◦	◦	—	◦	—	—	—	—
Power quality - Current Total Demand Distortion (TDD), Voltage Total Harmonic Distortion (THD), Sags (dips), Swells, and Interrupts	PQ	◦	◦	◦	◦	◦	◦			◦	◦	◦	◦	◦	◦
Automation and communications															
Max number of Digital Inputs		18	14	14	16	11	15	16	16	16	16	16	32	24	24
Max number of Digital Outputs		13	13	13	10	10	10	10	10	10	10	10	18	18	18
Max number of High-Speed Outputs (HSO's are optional and take the place of some digital outputs)		3	3	3	3	3	3	3	3	3	3	3	3	6	6
Current and Voltage sensor inputs		—	—	—	—	—	—	—	—	•	—	—	—	—	—
Sample values per IEC 61850-9-2LE		—	—	—	—	—	—	—	◦	◦	◦	◦	—	—	—

		REF615 Functional Application											REF620 Functional Application		
		Firmware Version 4.0, 4.2						Firmware Version 5.0 FP-1					Firmware Version 2.0		
Included = •, Optional = ◦	**ANSI Function**	**A**	**B**	**C**	**D**	**E**	**F[1]**	**D**	**F**	**L**	**N**	**P**	**A**	**B**	**C**
Automation and communications															
Front 100Base-TX Ethernet (RJ45) port		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Rear 100Base-TX Ethernet (RJ45) port		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-FX Ethernet (LC) port		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-TX Ethernet(RJ45) + RS-485(1x4-wire or 2x2-wire) + IRIG-B ports		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-FX Ethernet(LC) + RS-485(1x4-wire or 2x2-wire) + IRIG-B ports		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear [2 * Ethernet 100FX (LC) + Ethernet 10/100BaseT (RJ45) + serial glass fiber (ST)] w HSR/PRP		◦[1]	—	◦[1]	◦[1]	—	◦	◦	◦	◦	◦	◦	—	—	—
Rear 100Base-TX and -FX Ethernet (1 * LC, 2 * RJ45) + serial glass fiber (ST) ports w HSR/PRP [4]		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear 100Base-TX Ethernet (3 * RJ45) + serial glass fiber (ST) ports w HSR/PRP[4]		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
Rear [2 * Ethernet 100FX (LC) + Ethernet 10/100BaseT (RJ45)] w HSR/PRP		—	—	—	—	—	—	◦	◦	◦	◦	◦	—	—	—
Rear 100Base-TX Ethernet (3 * RJ45) w HSR/PRP		—	—	—	—	—	—	◦	◦	◦	◦	◦	—	—	—
Ethernet 100Base-TX (RJ45) + configurable RS232/RS485 + [RS485 or serial glass fiber (ST) + IRIG-B] ports[3]		◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦
DNP3.0, Modbus, and IEC61850 communication protocols		•	•	•	•	•	•	◦	◦	◦	◦	◦	•	•	•
Records															
Sequence of events recorder	SER	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Fault recorder	FLR	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Digital fault (waveform) recorder	DFR	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Load profile	LoadProf	•	—	•	•	—	—	•	•	•	•	•	•	•	•
Digital Fault Recorder signal channels (Analog/Digital)		4/64	4/64	4/64	4/64	4/64	4/64	12/64	12/64	12/64	12/64	12/64	12/64	12/64	12/64
Events recorder (FIFO), 1ms resolution		1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
Fault records		128	128	128	128	128	128	128	128	128	128	128	128	128	128

1 Firmware version 4.2 must be selected
2 Applicable for two breakers
3 May not be combined with Arc flash detection (AFD) option
4: HSR/PRP Redundancy option available only for 615 series 4.2 and 5.0 FP1

ABB Inc.
4300 Coral Ridge Drive
Coral Springs, Florida 33065
Phone: +1 954 752 6700

abb.com/mediumvoltage
abb.com/substationautomation

1MAC004642-SG REV C NOV 2017